

Phenomenon motion of galaxies in our universe

Vasilis Papamichael

Abstract: This is a letter that explains briefly and clearly why the galaxies of our universe seem to be in motion.

Introduction: One of the most important things that every creature in earth perceives, is its movement. Motion of galaxies is a consequence of the well known Big Bang theory. More precisely, according to that theory every galaxy increases continuously its distance from every other. Everybody can imagine our universe as a balloon that someone is blowing it. However, the query why our universe has a starting point and behaves this way is an open issue for discussion. In this letter this query is discussed using a modified expression for the speed of light.

Assumption: The speed of light has a stochastic nature determined by the following mathematical relationship

$$c(t) = c - \beta(t) * B(t) \quad (1)$$

c is the constant speed of light equal to 300000 Km/sec, u is the velocity of the object under test, which is not affecting the results, $\beta(t)$ is the number of photons in the light wave at the point of observation as a function of time and $B(t)$ is a variable to be determined.

Photons' Energy: The energy ($E(t)$ as a function of time) of a portion ($\alpha(t)$ as a function of time at the point of energy emission) of the mass (m) in every star can be translated into energy of photons ($E\phi(t)$) due to the nuclear fusion. The very well known equation that connects mass with energy is given by [1]

$$E\phi(t) = \alpha(t) * m * c(t)^2 \quad (2)$$

It holds for the photon's energy that [2]

$$E_{ph}(v) = h * v(BW \text{ [bandwidth]}) \quad (3)$$

Then, supposing that $t=1$, the portion of mass ($\alpha(1)$) can be translated into a number of photons ($\beta(N)$) where N the time elapsed until the photons came to the observer, assuming that the sphere of transmission is discretely divided into a very large amount of number or of a moving, in the spherical coordinate system, L_p - solid angle) using (1), (2) and (3)

$$\alpha(1) * m * (c - \beta(N) * B(N))^2 = \beta(N) * h * v(BW) \quad (4)$$

from (4) one can determine the variable $B(N)$. If one supposes that the whole mass is translated to photons then $\alpha(1)=1$, $\beta(N) * h * v(BW) = E\phi(N) \sim m * c^2$ ($c(N)$ almost equal to c) then $B(N)$ can be approached by the following mathematical relationship

$$B(N) = (c / \beta(N)) - \text{square}((\beta(N) * h * v(BW)) / m)$$

m/sec (5)

Doppler phenomenon: Now, then according to Doppler spread $\Delta v = u/\lambda$ [3], where λ is the wavelength of light, v is the frequency of light and u the speed of star under test, the speed of light is

$$c(t) = (\lambda_{\text{new}})^*(v(+/-)u/\lambda) - \beta(t)*B = c - \beta(t)*B(t) \quad (6)$$

which is the same as (1). The Doppler phenomenon, however, can also hold by assuming no motion at all as it will be analyzed in the following.

No Motion : If now the speed of galaxy under test is zero and the Doppler spread have effect, as a result, only on the frequency then the constant part of the speed of light must change to $c' = \lambda*(v + \Delta v) = c + u$ and then (1), by using c' instead of c , becomes

$$c(N) = c + u - \beta(N)*B(N) \quad (7)$$

By examining (7), since $c(N)$ is almost equal to c according to measurements, the term $\beta(t)*B(t)$ must be almost equal to the hypothetical u according to Doppler spread. Therefore, equations (2), (5) and (7) can be used in order to find the portion of mass of a star that turns into photons' energy.

Conclusion: The general conclusion is that we have proved the phenomenon movement of our galaxies in our universe using a different expression for the speed of light. This assumption led to the fact that the Doppler phenomenon can exist without any movement between the galaxies and it is the new expression of the speed of light that makes it hold. In other words, in a geometrical universe with no movement between its galaxies, hypothetical movement led to Doppler phenomenon in order to keep the speed of light constant. The application of this model is an open issue for research.

References: [1] Albert Einstein. [2] Max Planck. [3] Christian Doppler.